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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,032	07/13/2006	Sture Helmersson	1026-0006WOUS	1735

49698 7590 08/16/2010

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EXAMINER	
BOYD, ERIN M	

ART UNIT	PAPER NUMBER
3663	

MAIL DATE	DELIVERY MODE
08/16/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/586,032	HELMERSSON ET AL.	
	Examiner	Art Unit	
	Erin M. Boyd	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *28,30,31,33,34,36-48,50-52 and 54-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *28,30,31,33,34,36-48,50-52 and 54-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/21/2010 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 28-34, 36, 40-43, 47, 54, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,223 (herein after "Nylund") in view of U.S. Patent 5,331,679 (herein after "Hirukawa").**

3. Regarding Claim 28, Nylund teaches a spacer 7 for holding a number of elongated fuel rods 3 intended to be located in a nuclear plant (figure 2; column 2, lines

63-64), the spacer 7 enclosing a number of cells (space inside sleeve 9), each cell (spacing inside member 9) having a longitudinal axis and arranged to receive a fuel rod 3 in such a way that the fuel rod 3 extends substantially in parallel with the longitudinal axis (column 3, lines 11-12), each cell (space inside member 9) being formed by a sleeve 9, having an upper edge and a lower edge (figure 3; column 3, lines 10-11), the sleeve 9 including a number of abutment surfaces 10, which project inwardly towards the longitudinal axis (column 3, lines 11-12) and extend substantially in parallel with the longitudinal axis for abutment 10 to the fuel rod 3 to be received in the cell (space inside member 9) (column 3, lines 20-21), and the lower edge, seen transversely to the longitudinal axis, having a wave with wave peaks 9b, which are aligned with a respective one of said abutment surfaces 10, and wave valleys 9a located between two adjacent ones of said abutment surfaces 10 (figure 5; column 3, lines 29-31); and the sleeves 9 abut each other in the spacer 7 along respective connection areas, each extending substantially parallel to the longitudinal axis between one of said wave valleys 9a of the lower edge and the flat upper edge (figures 3 and 4).

Nylund fails to teach that the upper edge, seen transversely to the longitudinal axis, has a wave with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces, and that the connection areas extend substantially parallel to the longitudinal axis between one of the wave valleys lower edge and one of the wave valleys of the upper edge.

Hirukawa teaches a sleeve 12d wherein the upper edge, seen transversely to the

longitudinal axis, has a wave with wave peaks 21b, which are aligned with a respective one of said abutment surfaces 13a, and with wave valleys 22 located between two adjacent ones of said abutment surfaces 13a (figure 13).

A motivation for constructing the sleeve to have a wave with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces at the upper edge of said sleeve is to provide a guide for the smooth insertion of the fuel rod into the fuel spacer (Hirukawa; column 9, lines 46-51). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have a wave with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces at the upper edge of said sleeve.

Although Nylund and Hirukawa fail to independently teach an elongated abutment surface extending from one of said wave peaks of the upper edge to a respective one of said wave peaks of the lower edge and the connection area extending between the wave valley of the sleeve's upper edge, the combination of Nylund and Hirukawa suggests said limitation. Nylund teaches that the abutment surface 10 extends the whole length of the sleeve (column 3, lines 23-24), the connection areas extending substantially parallel to the wave valley of the lower edge to the upper edge of the sleeve (figures 3 and 4). As modified by the teaching of Hirukawa (i.e. modifying the sleeve of Nylund to included upper and lower wave peaks and valleys, as is taught in Hirukawa), the "whole length" would be from a wave peak of the upper edge to a

respective wave peak of the lower edge and the connection areas would each extend from the wave valley of the lower edge to the wave valley of the upper edge.

4. Regarding Claim 30, Nylund teaches a spacer 7 wherein each sleeve 9 includes at least four of said abutment surfaces 10 (figure 3; column 3, lines 17-18).

5. Regarding Claim 31, Nylund teaches a spacer 7 wherein each of said abutment surfaces 10 is formed by a respective ridge projecting inwardly towards the longitudinal axis (figure 3; column 3, lines 18-19).

6. Regarding Claim 32, Nylund teaches a spacer 7 wherein the sleeves 9 abut each other in the spacer 7 along a connection area 9a extending in parallel to the longitudinal axis, but fails to teach that the connection area extends in parallel to the longitudinal axis between one of said wave valleys of the upper edge and one of said one of said wave valleys of the lower edge.

However, when the teaching of Nylund are combined with those of Hirukawa (i.e. constructing the sleeve with wave peaks and wave valleys on upper and lower edges), as described in the rejection of Claim 28 above, the connection area extends in parallel to the longitudinal axis between one of said wave valleys of the upper edge and one of said one of said wave valleys of the lower edge.

The motivation for constructing the sleeve with wave peaks and wave valleys on upper and lower edges is to provide a guide for the smooth insertion of the fuel rod into

the fuel spacer (Hirukawa; column 9, lines 46-51). Thus, it would have been obvious to one of ordinary skill in the art to construct the sleeve with wave peaks and wave valleys on upper and lower edges.

7. Regarding Claim 33, Nylund teaches a spacer 7 with sleeves 9, but fails to teach that the sleeves are permanently connected to each other by means of weld joints.

Hirukawa teaches sleeves 12d that are permanently connected to each other by means of weld joints 23 (figure 13; column 1, lines 14-16).

A motivation for permanently connecting the sleeves with weld joints is to provide a simple, resilient, and inexpensive means for connecting the sleeves. Thus, it would have been obvious to one of ordinary skill at the time of the invention to permanently connect the sleeve with weld joints.

8. Regarding Claim 34, Nylund teaches a spacer 7 wherein said sleeves 9 are permanently connected to each other (figure 4, column 3, lines 33-37), but fails to teach that the sleeves are permanently connected to each other by means of weld joints and that said weld joint includes an edge weld at said connection area at at least one of the upper edge and the lower edge.

Hirukawa teaches sleeves 12d that are permanently connected to each other by means of weld joints 23 (figure 13; column 1, lines 14-16) and an edge weld at said connection area at at least one of the upper edge and the lower edge (figure 13; column 1, lines 14-16; *Examiner understands an edge weld to be a weld at an edge of a*

structure).

A motivation for placing an edge weld at at least one of the upper edge and the lower edge is to provide the weld at the location points that are most susceptible to disconnection. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to place an edge weld at at least one of the upper edge and the lower edge of the sleeve.

9. Regarding Claim 36, Nylund teaches a spacer 7 wherein substantially each sleeve 9 is a sleeve-like shape (figure 3). The limitation “each sleeve” followed by a method step “manufactured of a sheet-shaped material that is bent to the sleeve-like shape”, is only of patentable weight in as much as the method step distinguish the final structure, and to the extent not impacting final structure are taken to be product-by-process limitations and non-limiting. A product by process claim is directed to the product per se, no matter how they are actually made. See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al, 218 USPQ 289, 292 (Fed. Cir. 1983), and In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make clear that it is the patentability of the final structure of the product “gleaned” from the process steps that must be determined in a “product-by-process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

10. Regarding Claim 40, Nylund teaches a spacer 7 wherein substantially each sleeve 9 has a wave shape of the lower edge.

Nylund fails to teach that the upper edge of the sleeve has a wave shape; however, when the teaching of Nylund are combined with those of Hirukawa (i.e. constructing the sleeve with wave peaks and wave valleys on upper and lower edges), as described in the rejection of Claim 28 above, the upper edge of said sleeve was a wave shape.

A motivation for constructing the sleeve to have a wave shape at the upper edge is to provide a guide for the smooth insertion of the fuel rod into the fuel spacer (Hirukawa; column 9, lines 46-51). Thus, it would have been obvious to one of ordinary skill in the art to construct the sleeve with a wave shape at the upper edge. The limitation "each sleeve" followed by a method step "manufactured from a tubular material which is worked to the wave shape of the upper edge and the lower edge", is only of patentable weight in as much as the method step distinguish the final structure, and to the extent not impacting final structure are taken to be product-by-process limitations and non-limiting. A product by process claim is directed to the product per se, no matter how they are actually made. See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al, 218 USPQ 289, 292 (Fed. Cir. 1983), and In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make clear that it is the patentability of the final structure of the product "gleaned" from the process steps that must be determined in a "product-by-process" claim, and not the patentability of the process. See also

MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

11. Regarding Claim 41, Nylund teaches a spacer 7 wherein the sleeve 9 seen in the direction of the longitudinal axis has four substantially orthogonal long sides (see figure A below), wherein each long side includes one of said abutment surfaces 10 (figures 3 and 4).

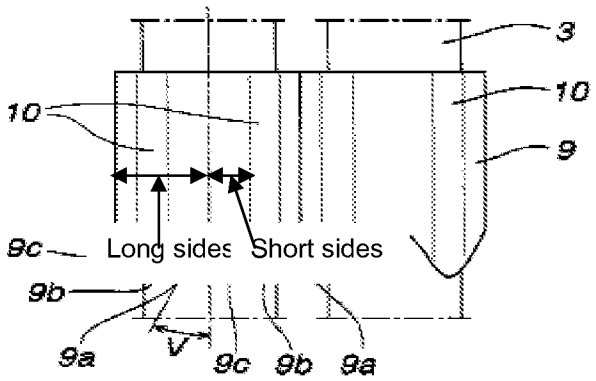


FIGURE A

12. Regarding Claim 42, Nylund teaches a spacer 7 wherein each long side (see figure A above) includes one of said wave peaks 9b of the lower edge, but fails to teach one of said wave peaks of the upper edge.

Hirukawa teaches a sleeve 12d with wave peaks 21b of the upper edge (figure 13).

A motivation for constructing the sleeve to have wave peaks of the upper edge is to provide a guide for the smooth insertion of the fuel rod into the fuel spacer (Hirukawa;

column 9, lines 46-51). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have wave peaks at the upper edge.

13. Regarding Claim 43, Nylund teaches a spacer 7 wherein the sleeve 9, seen in the direction of the longitudinal axis, has four substantially orthogonal short sides (see figure A above), wherein each short side connects two of said long sides (see figure A above) and includes with a portion of one of said wave valleys 9a of the lower edge, but fails to teach that said short sides include a portion of one said wave valleys of the upper edge.

Hirukawa teaches a sleeve 12d wherein short sides include with a portion of one of said wave valleys of the upper edge (figure 13).

A motivation for constructing the sleeve to have wave valleys of the upper edge is to provide a guide for the smooth insertion of the fuel rod into the fuel spacer (Hirukawa; column 9, lines 46-51). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have wave valleys at the upper edge.

14. Regarding Claim 47, Nylund teaches a spacer 7 wherein the nuclear plant is arranged to permit re-circulation of a coolant flow and wherein the spacer is arranged to be located in the coolant flow (column 3, lines 33-36), but fails to teach that the spacer includes at least one vane for influencing the coolant flow.

Hirukawa teaches a spacer 9b that includes at least one vane 32 for influencing the coolant flow (figure 3; column 5, lines 55-60.

A motivation for constructing the spacer to include at least one vane is to facilitate the recirculation of coolant within the reactor. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the spacer to include at least one vane.

15. Regarding Claim 54, Nylund teaches a spacer 7, but fails to teach that the spacer, seen in the direction of the longitudinal axis, has a substantially rectangular shape and includes at least two separate outer edge elements which extend along a respective side of the spacer.

Hirukawa teaches a spacer 9b wherein the spacer 9b, seen in the direction of the longitudinal axis, has a substantially rectangular shape and includes at least two separate outer edge elements 10, 11 which extend along a respective side of the spacer 9b (figure 2A; column 3, lines 55-58 and column 4, lines 6-8).

A motivation for constructing the spacer to have a substantially rectangular shape and at least two separate outer edge elements which extend along a respective side of the spacer is to provide outer support for a group of sleeves holding fuel rods that fits within the reactor channel. Said spacers facilitate reducing vibration effects on the sleeves, in turn, avoiding cracking and disconnection at weld location. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to

construct the spacer to have a substantially rectangular shape and at least two separate outer edge elements which extend along a respective side of the spacer.

16. Regarding Claim 57, Nylund teaches a fuel unit 1 for a nuclear plant including a number of elongated fuel rods 3 and a number of spacers 7 for holding the fuel rods 3 (figure 2; column 2, lines 63-64), wherein each of the spacers 7 enclose a number of cells (space inside sleeve 9), which each have a longitudinal axis and is arranged to receive one of said fuel rods 3 in such a way that the fuel rod 3 extends in parallel to the longitudinal axis (column 3, lines 11-12), each cell (space inside member 9) is formed by a sleeve 9, which has an upper edge and a lower edge (figure 3; column 3, lines 10-11), the sleeve 9 includes a number of elongated abutment surfaces 10, which project inwardly towards the longitudinal axis (column 3, lines 18-19) and extend substantially in parallel with the longitudinal axis for abutment to the fuel rod 3 to be received in the cell (space inside member 9) (column 3, lines 20-21); the lower edge, seen transversely to the longitudinal axis, has a wave with wave peaks 9b, which are aligned with a respective one of said abutment surfaces 10, and wave valleys 9a located between two adjacent ones of said abutment surfaces 10 (figure 5; column 3, lines 19-31); the sleeves 9 abut each other in the spacer 7 along respective connection areas, each extending substantially parallel to the longitudinal axis between on of said wave valleys of the lower edge and the flat upper edge.

Nylund fails to teach that the upper edge, seen transversely to the longitudinal axis, has a wave with wave peaks, which are aligned with a respective one of said

abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces, and that the connection areas extend substantially parallel to the longitudinal axis between one of the wave valleys lower edge and one of the wave valleys of the upper edge.

Hirukawa teaches a sleeve 12d wherein the upper edge, seen transversely to the longitudinal axis, has a wave with wave peaks 21b, which are aligned with a respective one of said abutment surfaces 13a, and with wave valleys 22 located between two adjacent ones of said abutment surfaces 13a (figure 13).

A motivation for constructing the sleeve to have a wave with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces at the upper edge of said sleeve is to provide a guide for the smooth insertion of the fuel rod into the fuel spacer (Hirukawa; column 9, lines 46-51). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have a wave with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces at the upper edge of said sleeve.

Although Nylund and Hirukawa fail to independently teach an elongated abutment surface extending from one of said wave peaks of the upper edge to a respective one of said wave peaks of the lower edge, the combination of Nylund and Hirukawa suggests said limitation. Nylund teaches that the abutment surface 10 extends the whole length of the sleeve (column 3, lines 23-24), the connection areas

extending substantially parallel to the wave valley of the lower edge to the upper edge of the sleeve (figures 3 and 4). As modified by the teaching of Hirukawa (i.e. modifying the sleeve of Nylund to included upper and lower wave peaks and valleys, as is taught in Hirukawa), the "whole length" would be from a wave peak of the upper edge to a respective wave peak of the lower edge and the connection areas would each extend from the wave valley of the lower edge to the wave valley of the upper edge.

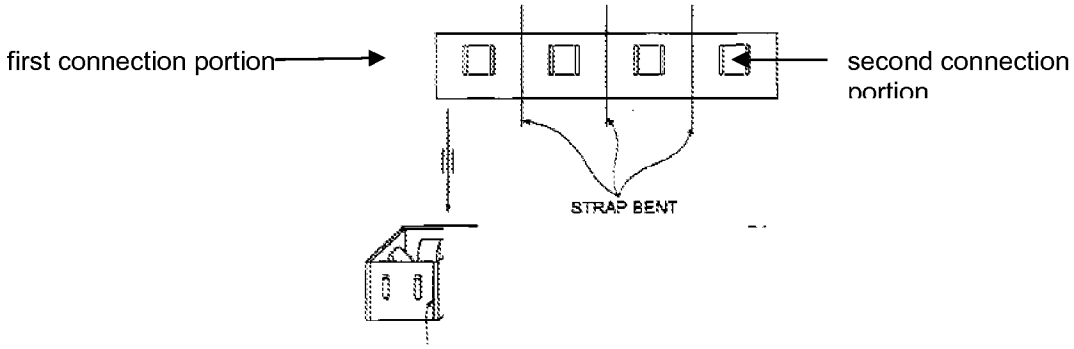
17. **Claims 37, 38, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,223 ("Nylund") and U.S. Patent 5,331,679 ("Hirukawa"), as applied to Claim 28, and further in view of U.S. Patent No. 6,901,128 (herein after "Mori et al.").**

18. Regarding Claim 37, Nylund teaches a spacer 7, but fails to teach that the sheet-shaped material before said bending has a first connection portion in the proximity of the a first end of the sheet-shaped material and a second connection portion in the proximity of a second end of the sheet-shaped material, wherein the first end overlaps the second end of the sleeve after said bending.

Mori et al. teaches that a sheet-shaped material (figure 23) before said bending has a first connection portion (see figure B below) in the proximity of the a first end of the sheet-shaped material and a second connection portion (see figure B below) in the proximity of a second end of the sheet-shaped material, wherein the first end overlaps the second end of the sleeve after said bending.

A motivation for constructing the spacer such that the sheet-shaped material before said bending has a first connection portion in the proximity of the a first end of the sheet-shaped material and a second connection portion in the proximity of a second end of the sheet-shaped material, wherein the first end overlaps the second end of the sleeve after said bending is to facilitate constructing a sleeve from a single sheet of material with an interface at the ends of the single sheet of material where a connection means can be incorporated (e.g. a weld). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the spacer such that the sheet-shaped material before said bending has a first connection portion in the proximity of the a first end of the sheet-shaped material and a second connection portion in the proximity of a second end of the sheet-shaped material, wherein the first end overlaps the second end of the sleeve after said bending.

19. FIGURE B



20. Regarding Claim 38, Nylund teaches a spacer 7, but fails to teach that the first connection portion and the second connection portion are permanently connected to

each other by means of at least one weld joint.

Mori et al. teaches that that the first connection portion (see figure B above) and the second connection portion (see figure B above) are permanently connected to each other by means of at least one weld joint (laser weld) (figure 23; column 14, liens 42-44).

A motivation for welding the first connection portion to the second connection portion is to provide a simple, resilient, and inexpensive means for forming. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to weld the first connection portion to the second connection portion.

21. Regarding Claim 39, Nylund teaches a spacer 7, but fails to teach that said weld joint includes a spot weld. Mori et al. teaches a weld (figure 23; laser weld), but fails to teach that said weld is a spot weld; however, spot welding is an old and well known type of welding in the art as evidenced in Hirukawa (Abstract, lines 16-20).

The motivation for using a spot weld is to provide a resilient weld without excessive heating to the rest of the sheet due to the short amount of time necessary to accomplish a spot weld. Thus, it would have been obvious to one of ordinary skill in the art to connect the first connection portion and the second connection portion employing a spot weld.

22. **Claims 48 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,223 ("Nylund"), U.S. Patent 5,331,679 ("Hirukawa"), and**

U.S. Patent No. 6,901,128 ("Mori et al."), as applied to Claim 37, and further in view of U.S. Patent No. 5,272,741 (herein after "Masuhara et al").

23. Regarding Claim 48, Nylund teaches a spacer 7 wherein the nuclear plant is arranged to permit re-circulation of coolant flow, wherein the spacer is arranged to be located in the coolant flow, but fails to teach that that spacer includes at least on vane for influencing coolant flow, said vane being formed by a portion of the material, which extends from the first connection portion.

Mori et al. teaches a first connection portion (see figure B above), but fails to teach that a vane is formed extending from said portion.

Masuhara et al. teaches that a vane 8 for influencing coolant flow formed by a portion of the material. *Examiner notes that if the sleeve of Masuhara et al. 7 is constructed by a folding sheet, like that taught in Mori et al., then the vane would extend from the first connection portion since the sleeve is constructed of a single sheet.*

A motivation for constructing the sleeve with a vane extending from the first connection portion is to facilitate coolant circulation without having to weld/attach vanes onto the sleeve. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve with a vane extending from the first connection portion.

24. Regarding Claim 51, Nylund teaches a spacer 7, but fails to teach that a vane is inclined in relation to the longitudinal axis.

Masuhara et al. teaches a vane 8 that is inclined in relation to the longitudinal axis (figure 2 and 3).

A motivation for constructing the vane to incline in relation to the longitudinal axis is to facilitate the circulation of coolant by providing structures (vanes) that extend into the coolant path. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the vane to incline in relation to the longitudinal axis.

25. **Claims 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,223 ("Nylund") and U.S. Patent 5,331,679 ("Hirukawa"), as applied to Claim 28, and further in view of U.S. Patent No. 4,800,061 (herein after "Shallenberger et al.").**

26. Regarding Claim 44, Nylund teaches a spacer 7 and a sleeve 9, but fails to teach that the sleeve has a thickness of the material, which is less than 0.24 mm.

Shallenberger et al. teaches a sleeve 70 that has a thickness of the material, which is less than 0.24 mm (figures 7 and 8; column 8, lines 23-29, 46-51).

A motivation for constructing the sleeve to have a thickness which is less than 0.24 mm is to minimize the pressure drop in the coolant flow. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have a thickness which is less than 0.24 mm.

27. Regarding Claim 45, Nylund teaches a spacer 7 and a sleeve 9, but fails to teach that the sleeve has a thickness of the material, which is less than 0.20 mm.

Shallenberger et al. teaches a sleeve 70 that has a thickness of the material, which is less than 0.20 mm (figures 7 and 8; column 8, lines 23-29, 46-51).

A motivation for constructing the sleeve to have a thickness which is less than 0.20 mm is to minimize the pressure drop in the coolant flow. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have a thickness which is less than 0.20 mm.

28. Regarding Claim 46, Nylund teaches a spacer 7 and a sleeve 9, but fails to teach that the sleeve has a thickness of the material, which is less than 0.18 mm.

Shallenberger et al. teaches a sleeve 70 that has a thickness of the material, which is less than 0.18 mm (figures 7 and 8; column 8, lines 23-29, 46-51).

A motivation for constructing the sleeve to have a thickness which is less than 0.18 mm is to minimize the pressure drop in the coolant flow. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to have a thickness which is less than 0.18 mm.

29. **Claims 50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,223 ("Nylund") and U.S. Patent 5,331,679 ("Hirukawa"), as applied to Claim 28, and further in view of U.S. Patent No. 5,272,741 (herein after "Masuhara et al.").**

30. Regarding Claim 50, Nylund teaches a spacer 7, but fails to teach that the sleeve includes a slit, which extends from at least one of the upper edge and lower edge and which permits outward bending of a part of the sleeve for forming said vane.

Masuhara et al. teaches a spacer 6 wherein the sleeve 7 includes a slit (figure 2), which extends from at least one of the upper edge and lower edge and which permits outward bending of a part of the sleeve 7 for forming said vane 8 (figure 2).

A motivation for constructing the sleeve to include a slit which extends from at least one of the upper edge and lower edge and which permits outward bending of a part of the sleeve for forming said vane is to facilitate coolant circulation without having to weld/attach vanes onto the sleeve. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the sleeve to include a slit which extends from at least one of the upper edge and lower edge and which permits outward bending of a part of the sleeve for forming said vane.

31. Regarding Claim 52, Nylund teaches a spacer 7 wherein the sleeve 9 seen in the direction of the longitudinal axis has four substantially orthogonal long sides (figure 4), but fails to teach that a vane extends outwardly from one of said long sides (see figure A above).

Masuhara et al. teaches a vane 8 that extends outwardly from one of side of the sleeve 7. If the teachings of Masuhara are combined with the teachings of Nylund (i.e. the vanes, taught in Masuhara, constructed on the sleeve, taught in Nylund), the vane

would necessarily extend outwardly from one of said long sides of the sleeve (Nylund) since the sleeve is a single piece.

A motivation for constructing the sleeve with a vane that extends outwardly from one of said long sides is to impart a swirling motion to the coolant which increases the thickness of the liquid film whereby heat transfer from the fuel rod to the coolant is promoted (Masuhara et al.; column 4, lines 49-61). Thus, it would have been obvious to one of ordinary skill in the art to construct the sleeve with a vane that extends outwardly from one of the long sides.

32. **Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,223 ("Nylund") and U.S. Patent 5,331,679 ("Hirukawa"), as applied to Claim 28, and further in view of U.S. Patent No. 5,778,035 (herein after "Nylund (2)").**

33. Regarding Claim 55, Nylund teaches the spacer 7, but fails to teach that one of the four corners of the rectangular shape is reduced through the lack of outer sleeve, and that the spacer includes a separate inner edge element, which extends along two of said sides and along said reduced corner.

Nylund (2) teaches a spacer 11 wherein one of the four corners of the rectangular shape is reduced through the lack of outer sleeve 7f, and that the spacer 11 includes a separate inner edge element a, b which extends along two of said sides and along said reduced corner (figure 6; column 6, lines 45-67).

A motivation for constructing the spacer wherein one of the four corners of the rectangular shape is reduced through the lack of outer sleeve is to reduce turbulence in the coolant flow by eliminating obstructions (spacer structure that is not filled by sleeves) and the motivation for constructing the spacer to include a separate inner edge element, which extends along two of said sides and along said reduced corner to provide addition lateral support for the fuel rods extending through the sleeves. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the spacer wherein one of the four corners of the rectangular shape is reduced through the lack of outer sleeve, and that the spacer includes a separate inner edge element, which extends along two of said sides and along said reduced corner.

34. Regarding Claim 56, Nylund teaches a spacer 7, but fails to teach that the inner edge element includes a vane, which is located at said reduced corner and which is inclined upwardly and inwardly towards a centre of the spacer.

Masuhara et al. teaches a spacer 11, wherein the inner edge element a,b includes a vane 12, which is located at said reduced corner and which is inclined upwardly and inwardly towards a centre of the spacer 11 (figure 6; column 6, lines 57-61).

A motivation for constructing the spacer such that the inner edge element includes a vane, which is located at said reduced corner and which is inclined upwardly and inwardly towards a centre of the spacer is to facilitate mixing of the coolant flow and temperature equalization thereof within the mixing cross section (Nylund (2); column 6,

lines 57-61 and column 5, lines 60-65). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the spacer such that the inner edge element includes a vane, which is located at said reduced corner and which is inclined upwardly and inwardly towards a centre of the spacer.

Response to Arguments

1. Applicant's arguments filed 6/30/2010 have been fully considered but they are not persuasive.

2. The arguments incorporated by reference on page 9, lines 1-2 of Applicant's remarks have been addressed in previous office actions.

3. It appears that Applicant only other argument is that the combination of the teachings of Nylund and Hirukawa would lead to a spacer starting from the spacer disclosed in Nylund, having wave shape also at the upper edge, wherein the wave peaks of the upper edge would be aligned with the wave valley of the lower edge rather than the upper edge.

The Examiner disagrees. The combined teachings suggest modifying Nylund such that the wave valleys of the lower edge are in line with the wave valleys of the upper edge and the wave peaks of the lower edge are in line with the wave peaks of the upper edge. In figure 13 of Hirukawa, it is shown that wave valleys 23 of the lower edge are in line with the wave valley of the upper edge of the sleeve 12d and the wave peaks

of the lower edge are in line with the wave peaks of the upper edge. Although there are two wave peaks in line with one wave peak of the upper edge in figure 13, the claims do not preclude this feature and the figure still meets the claim limitation.

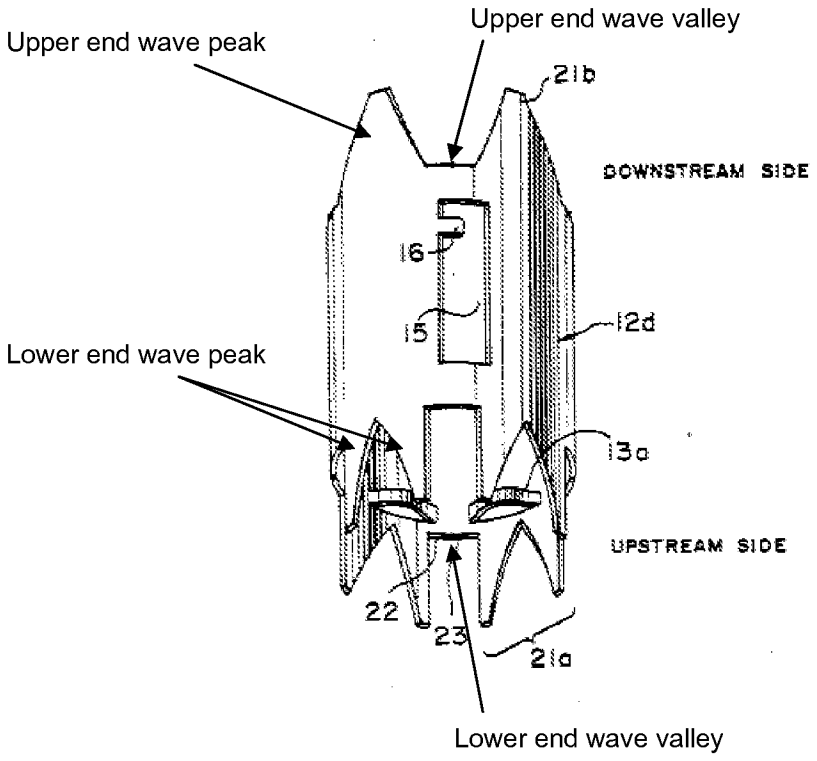


FIG. 13

Conclusion

4. This is a continuation of applicant's earlier Application No. 10/586032. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. Boyd whose telephone number is (571) 270-5378. The examiner can normally be reached on Monday - Friday 9:00-6:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E. M. B./
Examiner, Art Unit 3663

/Rick Palabrica/
Primary Examiner, Art Unit 3663